

Chapter 4

Natural Community Assessment and Conservation Measures

4.1 Introduction

Habitats considered natural communities in the project area include tidal perennial aquatic, tule and cattail tidal emergent, valley/foothill riparian, and upland cropland. These communities have been designated as land cover types and, more specifically, named for mapping in the SDIP study area and project area (Tables 4-1 and 4-2).

Table 4-2. Fish Species Groups and Associated Natural Community Habitat Types

Included Species	Fish Species Group	Natural Community Habitat Type
Sacramento River winter-run Chinook salmon	Anadromous	Tidal perennial aquatic/tidal emergent wetland
Central Valley spring-run Chinook salmon	Anadromous	Tidal perennial aquatic/tidal emergent wetland
Central Valley steelhead	Anadromous	Tidal perennial aquatic
Green sturgeon	Anadromous	Tidal perennial aquatic
Delta smelt	Estuarine	Tidal perennial aquatic/tidal emergent wetland

This chapter describes the status of each natural community, the impacts of the project on each natural community, and the conservation measures that will be implemented to avoid, minimize, and compensate for each impact. Except where noted below, the methods used to assess the impacts on each natural community are described in Chapter 3. In addition, this chapter describes the extent, function, values, and special-status species associated with each natural community and fish group that could be affected by the SDIP.

ASIP conservation measures were derived from the SDIP EIS/EIR mitigation measures (Jones & Stokes 2005), the Fish and Wildlife Coordination Act Report,

the Programmatic NCCP Determination (CALFED Bay-Delta Program 2000c), and the MSCS conservation measures (CALFED Bay-Delta Program 2000a). The ASIP conservation measures are consistent with the MSCS programmatic conservation measures and were developed in coordination with the regulatory agencies during the ASIP team meetings and during the review of the SDIP EIS/EIR (Jones & Stokes 2005).

This chapter also describes the expected outcome of implementing the project and conservation measures and how the CALFED Program has contributed to the conservation of each natural community. Figures 2-1–2-7 show the affected habitats for the SDIP study area.

4.1.1 Definition of SDIP Study Area and Project Area

As described in Section 1.2, Terminology, *study area* refers to the area covered by the USGS quadrangles that were surveyed as part of the CNDDDB search and includes those areas in which DWR performed vegetation mapping and wildlife and botanical surveys (Figure 1-1). *Project area* refers to the area within the footprint of the proposed gates, the channel dredging areas, the temporary spoils ponds and spoils drying areas, the permanent runoff management basins, and the mitigation sites (pending).

4.1.2 Natural Community Surveys

Natural communities were mapped throughout the study area in the vicinity of the permanent gates, channel dredging areas, and waterways in the vicinity of these areas that may be affected by gate construction and channel dredging (Figures 2-1–2-7). DWR botanists mapped and characterized representative sites for the major land cover types in the SDIP area of impact. Large representative stands of the dominant vegetation types were selected at sites throughout the study area. The vegetation was described (e.g.; species composition and cover), and the location was recorded with a GPS unit. These representative sites were mapped directly onto ortho-rectified, georeferenced aerial photographs of the area (September 1, 2000, 1:2,400 scale, acquired at low tide). The aerial photographs were used to classify and map riparian/streamside vegetation. Acreages were calculated either from the GIS data or were planimetered from the aerial photographs.

In August and September 2001 and June and July 2003, DWR staff conducted a wetland delineation of most of the project area according to the methods outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). In November 2004, Jones & Stokes staff conducted a wetland delineation of the potential spoils pond areas. Other waters of the United States,

Table 4-1. Existing Land Cover Types in the SDIP Study Area and Project Area

NCCP Community Type	Land Cover Type	Acres in Study Area	Acreage at Gate Sites				Acreage at Dredging Areas			Acreage at Dredge Material Disposal Sites
			Middle River Flow Control Gate	Grant Line Canal Flow Control Gate	Old River at DMC Flow Control Gate	Head of Old River Fish Control Gate	West Canal Conveyance Dredging Area	Middle River Conveyance Dredging Area	Old River Conveyance Dredging Area	
Tidal perennial aquatic	Tidal perennial aquatic	2,225.6	8.3	10.4	3.7	7.6	73.0	72.7	123.5	0
Tidal freshwater emergent	Tule and cattail tidal emergent wetland	121.2	0.5	0.4	0.4	0	3.3	6.6	8.7	0
Valley/foothill riparian	Cottonwood-willow woodland (upland and wetland)	384.5	0.4	1.9	0	0	14.2	28.3	69.0	3.8
	Valley oak riparian woodland	82.6	0	0	0	0	0.1	14.7	23.5	0.8
	Riparian scrub (upland and wetland)	131.9	0.7	1.0	0.9	0	5.0	28.2	24.2	2.4
	Willow scrub (upland and wetland)	133.6	0	0.1	0.2	0	4.3	14.4	25.5	6.6
	Giant reed stand	12.7	0	0	0	0	0.4	0.1	3.7	0
Upland cropland	Agriculture	125.5	0.5 ¹	2.5 ¹	13.5 ¹	1.6 ¹	0	0	0	101.5
Not applicable	Developed land	6.8	– ²	– ²	– ²	– ²	0	0	0.5	0
Not applicable	Landscaping	2.4	0	0	0	0	0	0	0.1	0
Not applicable	Ruderal	526.1	0.2	1.0	0	3.2	29.5	122.7	78.29	47.4
	Total	3,572.9	10.6	17.3	18.7	12.4	129.8	287.7	356.9	162.6

¹ Part of the agricultural land acreage included in the gate site dredge drying areas is ruderal vegetation, which has not yet been separately mapped in these areas.

² Developed land was not mapped at the gate sites.

including tidal perennial aquatic habitat, were identified based on the definition of waters of the United States (33 CFR Part 328).

4.2 Relationship to the CALFED Programmatic EIS/EIR

As described in Chapter 1, the following five documents establish the CALFED Program's compliance with the ESA, CESA, and the NCCPA:

- MSCS,
- USFWS Programmatic BO,
- NOAA Fisheries Programmatic BO,
- Programmatic NCCP Determination, and
- Conservation Agreement.

The MSCS is a technical appendix to the Programmatic EIS/EIR that explains how the CALFED Program will meet the requirements of the ESA, CESA, and the NCCPA. The MSCS was used only to provide guidance for developing mitigation for the impacts of the SDIP on ASIP-covered species and natural communities. The SDIP EIS/EIR and ASIP each stand alone and include an independently developed analysis of the impacts of the SDIP and avoidance, minimization, and compensation measures to mitigate those impacts.

The MSCS conservation measures include measures to avoid, minimize, and compensate for the impacts of the CALFED Program project actions. A compensation conservation measure is a type of mitigation measure that replaces an affected resource value (e.g., restoring natural communities affected by a project action).

Mitigation measures presented in the SDIP ASIP are consistent with the following programmatic conservation measures in the MSCS:

- measures necessary to meet the requirements of the Programmatic BOs and
- conservation measures to avoid, minimize, and compensate for impacts on ASIP-covered species and natural communities.

Specific conservation measures for affected natural communities are listed in the appropriate resource sections in this chapter.

4.3 Anadromous and Estuarine Fish Species

The MSCS evaluates two fish species groups: anadromous and estuarine species. The fish species and habitat type associated with these fish species groups are listed in Table 4-2.

The MSCS conservation goal for the fish species is to achieve recovery objectives identified in recovery and restoration plans (CALFED Bay-Delta Program 2000a). In general, the goal is to substantially increase the extent and quality of fish populations and habitat.

For the purpose of this ASIP, the anadromous and estuarine fish species groups are made up of the fish species addressed in Chapter 6. The reader is referred to Chapter 6 for a discussion on the impact assessment methodology, impacts, and conservation measures related to fish species. A discussion on the impact assessment methodology, impacts, and conservation measures related to tidal perennial aquatic and tidal emergent wetland habitats is provided below.

4.4 Natural Communities

The following sections provide an assessment of project impacts on natural communities in the project area and identify conservation measures for these communities. The assessment of project impacts for each community includes:

- the current status of the communities in the study area,
- a description of the direct and indirect impacts of the project on the communities,
- conservation measures for each community,
- a description of the objectives to fulfill the conservation measures for each community, and
- a description of the expected outcome of implementing the project and conservation measures for the communities.

4.5 Tidal Perennial Aquatic Habitat

4.5.1 Status in the Study Area

Tidal perennial aquatic habitat is characterized by open water. This community is made up of deepwater aquatic (i.e., greater than approximately 3 meters [10 feet] deep from mean low low tide), shallow aquatic (i.e., less than or equal to approximately 3 meters [10 feet] deep from mean low low tide), and unvegetated intertidal (i.e., tidal flats) zones of estuarine bays, river channels, and sloughs (CALFED Bay-Delta Program 2000a).

Approximately 2,225.6 acres of jurisdictional tidal perennial aquatic habitat occur in the study area. Approximately 30 acres are within the gate sites and 298.97 acres are within the channel dredging areas (Table 4-1). In the project area, tidal perennial aquatic habitat includes sloughs and channels. The deepwater aquatic zone is made up largely of unvegetated areas, with beds of aquatic plants occasionally occurring in shallower open-water areas.

Typical tidal perennial aquatic plant species include water hyacinth, water primrose, common waterweed, hornwort, parrot's feather, and western milfoil. Colonies of these aquatic plants are generally infrequent in the project areas. However, mats of noxious weeds, such as water hyacinth or Brazilian waterweed, have the potential to clog waterways, shade habitat for native aquatic vegetation, and smother low-growing intertidal vegetation when washed onto channel banks (California Exotic Pest Plant Council 1999; California Department of Boating and Waterways 2000, 2001). Vegetation, when present, is generally restricted to waterways with low water velocities and areas with low levels of disturbance.

Tidal perennial aquatic habitat is considered jurisdictional waters of the United States under Section 404 of the CWA.

No ASIP-covered plant species are known to occur in the tidal perennial aquatic habitat in the study area.

Deepwater areas provide foraging habitat, roosting habitat, and escape cover for diving ducks, cormorants, grebes, and other waterfowl that are permanent residents or that winter in the project area (CALFED Bay-Delta Program 2000b). Deepwater areas provide habitat for several species of reptiles and amphibians, including western pond turtles and western garter snake. Common mammal species in the deepwater areas include river otter and muskrats.

Shallow aquatic areas provide foraging habitat for wading birds, diving and dabbling ducks, other waterfowl species, kingfishers, and wading birds. Shallow aquatic areas provide rearing habitat, foraging habitat, and escape cover for reptiles and amphibians and may be used as foraging habitat by river otter and raccoon.

Tidal flats provide important foraging habitat for migratory, resident, and wintering shorebirds, wading birds, and numerous other bird species. Tidal flats typically contain large concentrations of aquatic invertebrates and mollusks, which serve as the primary food source of shorebirds.

4.5.2 Project Impacts

4.5.2.1 SDIP Gate Construction, Channel Dredging, and Gate Operation

Permanent and temporary disturbance of tidal perennial aquatic habitat would occur during construction of the gates, channel dredging, and activities associated with agricultural siphon extension. Permanent loss of tidal perennial aquatic habitat would occur within the footprint of the gates. Temporary disturbance would occur as a result of any dewatering activities required for gate construction, as well as work in the channel associated with dredging.

Gate operations (i.e., opening and closing of the gates) would not result in an overall loss of tidal perennial aquatic habitat, but zone types could change between deepwater, shallow water, and tidal flats in the area upstream of the gates (i.e., there may be an increase in tidal flats because of the increased tidal range caused by gate operation). The individual acreage of each of these three zones has not been determined; therefore, the potential variation in abundance cannot be determined. The operations-related impact on tidal perennial aquatic habitat, overall, would not be considered adverse because these zones would be expected to reestablish as the system adapts to new water level fluctuations.

Project implementation is not expected to result in a decrease in shallow-water fish habitat, which is defined by the resources agencies as those areas of tidal perennial aquatic habitat with water depths less than 10 feet; therefore, there would be no decrease in shallow water habitat. Additional information regarding the loss of shallow-water habitat as it relates to fish habitat is provided in the individual species assessments in Chapter 6.

Gate Construction and Dredging

Gate construction would result in the permanent removal of 0.88 acre of tidal perennial aquatic habitat within the gate footprints (Table 4-3). Under preproject conditions, tidal perennial aquatic habitat at the gate sites is currently affected twice each year: in the spring by the placement of fill material to build temporary barriers and in the fall by the subsequent removal of the material. The proposed construction of gates would permanently remove this aquatic community within the gate footprint. The proposed structures within the footprint of each gate site would vary but would include bottom-hinged gates, flashboards, boat passages, and fish passages.

During construction, an additional 29.82 acres of tidal perennial aquatic habitat upstream and downstream of the permanent gate would be temporarily affected by in-channel work associated with gate construction and channel dredging associated with gate construction (Table 4-3).

Table 4-3. Land Cover Impacts Associated with Gate Construction and Dredging

Land Cover Type	Acreages Affected by Gate Construction				Total Permanent Impacts Associated with Gate Construction (acres)	Acreages Affected by Dredging ¹				Total Temporary Impacts Associated with Dredging (acres)	Impacts Associated with Dredge Material Disposal (acres)
	Middle River Flow Control Gate	Grant Line Canal Flow Control Gate	Old River at DMC Flow Control Gate	Head of Old River Fish Gate		Gate Sites	West Canal Conveyance Dredging Area	Middle River Conveyance Dredging Area	Old River Conveyance Dredging Area		
Tidal perennial aquatic	0.16	0.32	0.26	0.14	0.88	29.82	73.02	72.67	123.46	298.97	0
Tule and cattail tidal emergent wetland	0.07	<0.01	<0.01	0	<0.08	0	0	0	0	0	0
Cottonwood-willow woodland	0	0	0	0	0	0	— ²	— ²	— ²	<0.06 ²	0
Cottonwood-willow woodland wetland	0	0.03	0	0	0.03	0	— ²	— ²	— ²	<0.06 ²	0
Valley oak riparian woodland	0	0	0	0	0	0	— ²	— ²	— ²	<0.06 ²	0
Riparian scrub	0	0	0	0	0	0	— ²	— ²	— ²	<0.06 ²	0
Riparian scrub wetland	0.02	0.03	0.12	0	0.17	0	— ²	— ²	— ²	<0.06 ²	0
Willow scrub	0	0	<0.01	0	<0.01	0	— ²	— ²	— ²	<0.06 ²	0
Willow scrub wetland	0	0	0	0	0	0	— ²	— ²	— ²	<0.06 ²	0
Agricultural land	0.50	0.25	2.00	0	2.75	4.80 ³	0	0	0	4.80 ³	101.50
Ruderal	0	0.02	0	0.02	0.04	0	0	0	0	0	47.40

DMC = Delta-Mendota Canal.

¹ Dredge impacts assumed impacts on all tidal perennial aquatic habitat within the dredge area. Actual loss of tidal perennial aquatic habitat will probably be less as a result of confining dredge activities to the center of the channel.

² Dredge impacts on individual riparian land cover types are not yet determined because the exact placement of the stationary pipes has not been identified. The riparian impact will total up to 0.06 acre at the three dredge areas.

³ The acreage for the gate site agricultural impact includes the areas used for dredge drying at all four gate sites, which was assumed to require 1.2 acres at each site. Acreage for dredge drying areas at the three conveyance dredging areas is shown in the "Impacts Associated with Dredge Material Disposal" column.

Channel Dredging

Tidal perennial aquatic habitat in the channel dredging areas includes deepwater aquatic, shallow aquatic, and unvegetated intertidal zones. Impacts from dredging would be temporary and would primarily affect water quality. For the purpose of this analysis, it was assumed that all of the tidal perennial aquatic habitat in the channel dredging areas would be affected (Table 4-3). Dredging would affect 269.15 acres of tidal perennial aquatic habitat made up of:

- 73.02 acres in West Canal,
- 72.67 acres in Middle River, and
- 123.46 acres in Old River.

4.5.2.2 SDIP Mitigation Measures

The SDIP mitigation measures identified in the SDIP EIS/EIR to avoid, minimize, and compensate for the potential impacts on tidal perennial aquatic habitat are described below.

Mitigation Measure TPAQ1—Avoid and Minimize Disturbance of Tidal Perennial Aquatic Habitat

To the extent possible, DWR and Reclamation will avoid and minimize impacts on the tidal perennial aquatic habitat by implementing the environmental commitments listed in Chapter 2.

Mitigation Measure TPAQ2—Compensate for Loss of Tidal Perennial Aquatic Habitat

DWR and Reclamation will compensate for the permanent loss of up to 0.88 acre of tidal perennial aquatic habitat caused by construction of the Middle River, Grant Line Canal, Old River at DMC, and head of Old River gates at a ratio of 3 acres for each acre affected, for a total of up to 2.64 acres. DWR and Reclamation would purchase the tidal perennial aquatic habitat as mitigation credits from an approved mitigation bank in the project vicinity. One potential site is the Kimball Island Mitigation Bank.

This mitigation is consistent with the MSCS conservation measure for tidal perennial aquatic habitat to “restore or enhance 2 to 5 acres of additional in-kind habitat for every acre of affected habitat near where impacts on habitat are incurred” (CALFED Bay-Delta Program 2000a).

No compensation will be required for the temporary disturbance of up to 298.97 acres of tidal perennial aquatic habitat caused by conveyance dredging and gate dredging. Although the water depth within the dredged tidal perennial aquatic zones will be deeper there will be no loss of area associated with conveyance dredging and the temporary affects on water quality will subside following completion of dredging activities.

4.5.3 ASIP Conservation Measures

ASIP conservation measures for tidal perennial aquatic habitat are discussed below.

Conservation Measure TPAQ-1—Implement Mitigation Measure TPAQ1

Implementation of this conservation measure is consistent with the following MSCS programmatic conservation measure for tidal perennial aquatic habitat (CALFED Bay-Delta Program 2000a).

- Avoid or minimize disturbance to existing habitat.

Conservation Measure TPAQ-2—Implement Mitigation Measure TPAQ2

Implementation of this conservation measure is consistent with the following MSCS programmatic conservation measure for tidal perennial aquatic habitat (CALFED Bay-Delta Program 2000a).

- Design restorations and use construction methods that would minimize the release of sediment as a direct result of construction activities or subsequent erosion.

Implementation of Conservation Measures TPAQ-1 and TPAQ-2 will fully mitigate impacts of the SDIP on tidal perennial aquatic habitat, and no additional conservation measures are required.

4.5.4 Expected Outcomes

Implementation of ASIP Conservation Measures TPAQ-1 and TPAQ-2 achieves the ASIP goal of avoidance, minimization, and compensation for adverse impacts of SDIP actions on tidal perennial aquatic communities. Implementation of these conservation measures will help ensure that the existing functions and values of tidal perennial aquatic habitat in the project area are maintained.

4.6 Tule and Cattail Tidal Emergent Wetland

4.6.1 Status in the Study Area

The tule and cattail tidal emergent wetland community includes portions of the intertidal zones of the Delta that support emergent wetland plant species that are

not tolerant of saline or brackish conditions. Tidal emergent wetland includes all or portions of the freshwater emergent wetland, tidal and Delta sloughs, in-channel islands, and shoals (CALFED Bay-Delta Program 2000a). This community type occurs on in-channel islands and along mostly unveeved, tidally influenced waterways and qualifies as jurisdictional wetland under Section 404 of the CWA.

Approximately 121.2 acres of jurisdictional tule and cattail tidal emergent wetland habitat occur in the study area. Approximately 1.3 acres are within the gate sites, and 18.6 acres are within the channel dredging areas (Table 4-1). Tule and cattail tidal emergent wetland vegetation in the study area is partially exposed during low tides and is inundated during high tide. Soils remain saturated within this community, but the plants do not require constant inundation. These plants commonly spread by rhizomes and may have an extensive system of rhizomes in a wetland patch.

The tule and cattail tidal emergent wetland community occurs along all channels and most in-channel islands in the project area. This habitat occurs on the south bank and in-channel island at the Grant Line Canal site (Figure 2-2) and on the south bank of the Old River at DMC gate site (Figure 2-4). This tidal emergent wetland is also present on the east bank of the West Canal dredging area (Figure 2-5) and more extensively in the Middle River and Old River dredging areas (Figures 2-6 and 2-7).

Tules and cattails, along with common reed, buttonbush, sedges, and rushes, dominate the tule and cattail tidal emergent wetland community. This wetland community provides suitable habitat for the following special-status species: Suisun Marsh aster, slough thistle, rose-mallow, Delta tule pea, Mason's lilaeopsis, and Delta mudwort. Of these species, rose-mallow, Mason's lilaeopsis, and Delta mudwort were observed in the study area. None of these species is federally or state-listed.

Although tule and cattail tidal emergent wetland does not occur in large continuous patches, this cover type provides important wildlife habitat functions and values. Tule and cattail tidal emergent wetland occurring on or adjacent to in-channel islands provides habitat that is relatively isolated from human disturbance and land-based predators. This land cover type provides nesting and foraging habitat for several songbirds, rails, other wading birds, and waterfowl and provides foraging and cover habitat for common reptiles and amphibians.

4.6.2 Project Impacts

4.6.2.1 SDIP Gate Construction, Channel Dredging, and Gate Operation

Gate Construction

Gate construction would result in the loss of 0.08 acre of tule and cattail tidal emergent wetland. Construction of the Old River at DMC gate and the Grant Line gate would each result in the removal of less than 0.01 acre of tule and cattail tidal emergent wetland habitat (Table 4-3). Construction of the Middle River gate would each result in the removal of 0.07 acre of tule and cattail tidal emergent wetland habitat (Table 4-3). No tule and cattail tidal emergent wetland habitat is present at the head of Old River gate.

Dredging at Gate Sites

Dredging at the four gate sites would not result in any additional direct impacts on cattail and tule tidal emergent wetland (Table 4-3).

Conveyance Dredging

Direct impacts on tule and cattail tidal emergent wetland vegetation would be avoided within the West Canal, Middle River, and Old River dredge areas. The tidal emergent wetland is relatively sparse in these conveyance dredging areas and would be avoided during placement of the stationary pipes used for dredging.

Gate Operation

There are 121.2 acres of jurisdictional tule and cattail tidal emergent wetland habitat in the study area (Table 4-1). This habitat occurs in the intertidal zone up to the high-tide line. Cattail and tule vegetation in the study area is partially exposed during low tides and is inundated during high tide. Soils remain saturated within this habitat; therefore, the plants do not require constant inundation. These plants commonly spread by rhizomes and often have an extensive system of rhizomes within a wetland patch.

High-tide water elevations would remain approximately the same as existing conditions upstream of the gates during gate operation, except at the Grant Line Canal gate, where the high-tide elevation would decrease by up to 1 foot. Low-tide elevations would decrease by up to 1 foot from existing conditions with the temporary barriers during the summer months.

The net effect of the project would be an increase in the low-tide zone by up to 1 foot in the area upstream of each gate (i.e., on Middle River from the gate to Old River, on Grant Line Canal to Old River, and on Old River to the head of Old River). Downstream of the gates during the growing season, water elevations would be 2–3 inches lower than existing conditions at low tide and high tide. The net result would be a shifting of the water elevation downslope in the area downstream of the gate, but there would be no change in the extent of intertidal habitat.

Because of the adaptability of cattail and tule vegetation to alternating inundation and exposure and the rapidity of rhizome growth to colonize new habitat, the minor change in tide elevations upstream and downstream of the gates under project operations would not likely affect this habitat. Upstream vegetation could potentially increase in area and spread into the new lower-tide elevation. At the Grant Line Canal gate, the suitable habitat zone would shift downslope by 1 foot. Because the tidal range during project operations would not substantially change from existing conditions, gate operation would not be expected to have an adverse impact on the tule and cattail tidal emergent wetland vegetation.

4.6.2.2 SDIP Mitigation Measures

The SDIP mitigation measures identified in the SDIP EIS/EIR to avoid, minimize, and compensate for the potential impacts on tule and cattail tidal emergent wetland habitat are described below.

Mitigation Measure TTEW1—Avoid and Minimize Disturbance of Tule and Cattail Tidal Emergent Wetland Habitat

To the extent possible, DWR and Reclamation will avoid and minimize impacts on the tule and cattail tidal emergent wetland habitat. DWR and Reclamation will include the following measures in the project construction conditions to minimize indirect impacts on sensitive natural communities, including the tule and cattail tidal emergent wetland, and on special-status plants.

- DWR and Reclamation will provide a biologist/environmental monitor who will be responsible for monitoring implementation of the conditions in the state and federal permits (CWA Section 401, 402, and 404; ESA Section 7; Fish and Game Code Section 1601; project plans (SWPPP); and SDIP EIS/EIR mitigation measures).
- The biologist/environmental monitor will determine the location of environmentally sensitive areas adjacent to each gate site and dredge area based on mapping of existing land cover types and special-status plant species. To avoid construction-phase disturbance to sensitive habitats immediately adjacent to the project area, the monitor will identify the boundaries of sensitive habitats and add a 50-foot buffer, where feasible, using orange construction gate fencing. The fencing will be mapped on the project designs. Erosion-control fencing will also be placed at the edges of construction where the construction activities are upslope of wetlands and channels to prevent washing of sediments offsite. The ESA and erosion-

control fencing will be installed before any construction activities begin and will be maintained throughout the construction period.

- The biologist/environmental monitor will ensure the avoidance of all sensitive habitat areas, including patches of tule and cattail tidal emergent wetland in channels, during dredging operations.
- DWR and Reclamation will provide a worker environmental training program for all construction personnel prior to the start of construction activities. The program will educate workers about special-status species, riparian habitats, and waters of the United States present on and adjacent to the site and also about the regulations and penalties for unmitigated impacts on these sensitive biological resources.
- Landing on in-channel islands, anchoring boats and/or barges to these islands, and encroaching by construction personnel on the islands will be prohibited. The exception to this measure is at Grant Line Canal, where the utility lines will cross the island, and construction personnel will have to access the utility corridor during installation.
- Following construction at the gate sites, the construction contractor will remove all trash and construction debris and implement a revegetation plan for temporarily disturbed vegetation in the construction zones. The elements that will be included in the revegetation of these sites are described in Mitigation Measure TTEW2.

Mitigation Measure TTEW2—Compensate for Loss of Tule and Cattail Tidal Emergent Wetland Habitat

DWR and Reclamation will compensate for the unavoidable permanent loss of up to 0.08 acre of tule and cattail tidal emergent wetland habitat caused by construction of the gates by restoring or enhancing in-kind habitat at a ratio of 3 acres for each acre affected, for a total of 0.24 acre. Revegetation will be planned and implemented prior to the removal of existing tidal emergent wetland vegetation.

The 0.24 acre of tidal perennial aquatic habitat would be purchased as mitigation credits from an authorized mitigation bank in the project vicinity.

Mitigation Measure TTEW3—Monitor Existing Stands of Tidal Emergent Wetland Vegetation during the Gate Operations Phase

DWR and Reclamation will monitor the extent of tidal emergent wetland vegetation during the gate operation phase of the project to determine whether changes in the tidal zone that occur as a result of gate operations cause the loss of tidal emergent wetland vegetation. As stated in Section 4.5.2.1, “SDIP Gate Construction, Channel Dredging, and Gate Operation,” gate operation would result in a shift in the tidal range of approximately 1.0 foot upstream of the Grant Line Canal gate. DWR and Reclamation will monitor the extent and condition of the existing tidal emergent wetland for a distance of 0.5 mile upstream of the Grant Line Canal gate for a 5-year period after the gate is constructed.

The extent of tidal emergent wetland will be mapped on an aerial photograph and compared to the baseline mapping performed by DWR. If a decrease in tidal emergent wetland vegetation is observed, DWR and Reclamation will compensate for the loss of this vegetation by implementing Mitigation Measure TTEW2.

4.6.3 ASIP Conservation Measures

The ASIP conservation measures for tule and cattail tidal emergent wetland habitat are discussed below.

Conservation Measure TTEW-1—Implement Mitigation Measures TTEW1 and TTEW3

Implementation of these conservation measures is consistent with the following MSCS programmatic conservation measure for tule and cattail tidal emergent wetland habitat (CALFED Bay-Delta Program 2000a).

- Avoid or minimize disturbance to existing habitat.

Conservation Measure TTEW-2—Implement Mitigation Measure TTEW2

Implementation of this conservation measures is consistent with the following MSCS programmatic conservation measure for tule and cattail tidal emergent wetland habitat (CALFED Bay-Delta Program 2000a).

- Restore or enhance 2–5 acres of additional in-kind habitat for every acre of affected habitat, near where impacts are incurred, before implementing actions that could result in the loss or degradation of habitat.

Implementation of ASIP Conservation Measures TTEW-1, TTEW-2, and TTEW-3 will fully mitigate impacts of the SDIP on tule and cattail tidal emergent wetland habitat. No additional conservation measures are required.

4.6.4 Expected Outcomes

Implementation of the ASIP Conservation Measures TTEW-1, TTEW-2, and TTEW-3 achieves the ASIP goal to avoid, minimize, and compensate for adverse impacts of SDIP actions on tule and cattail tidal emergent wetland habitat. Implementation of these conservation measures will help ensure that the existing functions and values of tule and cattail tidal emergent wetland habitat in the project area are maintained.

4.7 Valley/Foothill Riparian Community

For the purpose of this project, the valley/foothill riparian natural community has been divided into four types of riparian communities: cottonwood-willow woodland, valley oak riparian woodland, riparian scrub, and willow scrub. Each of these communities supports a distinct assemblage of species.

Most valley/foothill riparian communities were identified as nonjurisdictional (i.e., not regulated under Section 404 of the CWA) because they do not have wetland hydrology. Valley/foothill riparian communities on in-channel islands, however, occur at lower elevations and are close to or within the high-tide elevation. These riparian areas were identified as jurisdictional wetlands.

4.7.1 Status in the Study Area

Riparian habitats are considered to be among the most productive wildlife habitats in California and typically support the most diverse wildlife communities. In addition to providing important nesting and foraging habitat, riparian woodlands function as wildlife movement corridors. Riparian habitat has been designated by DFG as a habitat of special concern in California because of its limited abundance and high value to wildlife.

Although riparian habitat in the study area typically occurs in narrow or discontinuous patches, this cover type provides important function and values for wildlife. Riparian habitat occurring on in-channel islands provides habitat that is relatively isolated from human disturbance and land-based predators. Also, aside from ornamental or landscape trees associated with farms or isolated trees in fields and along roadsides, riparian woodlands provide the only overstory and midstory vegetation in the study area. Overstory trees may be used for nesting and roosting by numerous raptors and also provide suitable habitat for other birds, such as herons, egrets, and numerous songbirds. Riparian habitat also provides important nesting and foraging cover for resident, migratory, and wintering songbirds. In addition, riparian vegetation provides habitat for several species of mammals.

4.7.1.1 Cottonwood-Willow Woodland

Approximately 384.5 acres of cottonwood-willow woodland occur in the study area. Approximately 2.3 acres occur in, or in the vicinity of, the gate sites, and approximately 115.3 acres occur in the vicinity of the channel dredging areas (Table 4-1). The cottonwood-willow woodland community typically occurs on channel islands, on levees, and along unmaintained channel banks of south Delta sloughs and rivers. The riparian zone along leveed islands is usually very narrow, but more extensive riparian areas occur on in-channel islands or other

unleveed areas. Cottonwood-willow woodland occurs at the Middle River, Grant Line Canal, and Old River at DMC gate sites.

Cottonwood-willow woodland occurs on an in-channel island at the Middle River gate site (Figure 2-3) and is dominated by mature black willow with an understory of shrubs, including California button-willow, sandbar willow, shining willow, and California rose.

Cottonwood-willow woodland at the Grant Line Canal gate site (Figure 2-2) is dominated by a mature stand of Fremont cottonwood that forms a nearly contiguous overstory and intergrades with cattail and tule tidal emergent marsh, riparian scrub, and willow scrub. Dominant understory species include black willow, sandbar willow, and shining willow. Other understory species include Himalayan blackberry, California blackberry, California button-willow, Indian hemp, California rose, coyote brush, and California black walnut. Herbaceous cover occurs where shrubs are sparse or absent and includes Santa Barbara sedge, hoary nettle, creeping wildrye, bracken fern, and hedge-nettle. Disturbed portions of the cottonwood-willow woodland at the Grant Line Canal site support many nonnative species or species introduced from elsewhere in the state, including Monterey pine, coast redwood, Modesto ash, Canary Island pine, acacia, tree of heaven, alepo pine, and gum tree. Herbaceous cover in disturbed sites includes ruderal species, such as Italian thistle, rigput brome, milk thistle, periwinkle, and poison hemlock.

The Old River at DMC gate site supports patches of cottonwood-willow woodland on both banks (Figure 2-4). This woodland includes scattered Fremont cottonwood on the levee bank with a ruderal understory.

Within the West Canal dredging area, cottonwood-willow woodland dominates an in-channel island and occurs in patches on banks (Figure 2-5). This woodland also occurs extensively in both the Middle River and Old River dredging areas and on proposed spoils pond sites DS-2 and 3 on Roberts Island (Figures 2-6 and 2-7).

Areas of cottonwood-willow woodland growing on in-channel islands or on levee banks in the high-tide line may qualify as jurisdictional wetlands under Section 404 of the CWA and are referred to in this chapter as cottonwood-willow woodland wetland. DFG considers riparian communities such as cottonwood-willow woodland to be rare natural communities and maintains a current list of their occurrence in the state in the CNDDDB (California Natural Diversity Database 2004).

4.7.1.2 Valley Oak Riparian Woodland

Approximately 83 acres of valley oak riparian woodland occur in the study area. There is no valley oak riparian woodland at the gate sites. Approximately 39 acres occur in the channel dredging areas and the spoils drying areas (Table 4-1). Valley oak riparian woodland is made up of areas where the dominant overstory

is valley oak. Associate species are similar to those described for the cottonwood-willow woodland vegetation. This riparian woodland occurs on banks and on in-channel islands in the study area. Within the project area, valley oak riparian woodland occurs within the Middle River and Old River dredge areas and on spoils pond site DS-2 (Figures 2-1–2-7). Areas of valley oak riparian woodland growing on in-channel islands or on levee banks in the high-tide line may qualify as jurisdictional wetlands under Section 404 of the CWA and are referred to in this chapter as valley oak riparian woodland wetland. DFG considers riparian communities such as valley oak riparian woodland to be rare natural communities and maintains a current list of their occurrence in the state in the CNDDDB (California Natural Diversity Database 2004).

4.7.1.3 Riparian Scrub

Approximately 132 acres of riparian scrub occur in the study area. Approximately 2.6 acres occur at, or in the vicinity of, the gate sites, and approximately 60 acres occur in the vicinity of the channel dredging areas and spoils drying areas (Table 4-1). Riparian scrub vegetation is dominated by dense stands of shrubs, such as California button-willow, wild rose, Himalayan blackberry, and white alder. Where shrub cover is absent, herbaceous cover is often abundant and includes Indian hemp, yellow iris, centaury, vervain, umbrella sedge, creeping bent grass, bugleweed, and hedge-nettle.

Riparian scrub also includes blackberry thickets, which intergrade with riparian habitats. These thickets are characteristically monotypic stands of Himalayan blackberry, with scattered and isolated trees and shrubs, including coyote brush, sandbar willow, shining willow, and white alder. Blackberry thickets occur in association with ruderal habitats; however, an herbaceous understory is not evident in these thickets. Elderberry shrubs may also be associated with this community type and are numerous at the DS-2 spoils pond site.

Riparian scrub vegetation occurs throughout the project area. Blackberry thickets occur on levee banks at the Middle River, Grant Line Canal, and Old River at DMC gate sites and on the in-channel island at Grant Line Canal (Figures 2-1–2-7). Riparian scrub also occurs at all three potential dredging areas and at spoils pond sites DS-2 and 3 on Roberts Island.

Riparian scrub on in-channel islands or on levee banks in the high-tide line may qualify as jurisdictional wetland under Section 404 of the CWA and are referred to in this chapter as riparian scrub wetlands. DFG considers riparian communities such as riparian scrub to be rare natural communities and maintains a current list of their occurrence in the state in the CNDDDB (California Natural Diversity Database 2004).

4.7.1.4 Willow Scrub

Approximately 133.6 acres of riparian scrub occur in the study area. Approximately 0.30 acre occurs at, or in the vicinity of, the gate sites, and approximately 51 acres occur in the vicinity of the channel dredging areas and spoils drying areas (Table 4-1).

Willow scrub is a type of riparian scrub habitat dominated by willow species, particularly sandbar willow and young trees of other willow species, such as shining willow and black willow. In disturbed areas, willow scrub intergrades with blackberry vegetation.

Willow scrub occurs at the Grant Line Canal gate site on the in-channel island, at the Old River at DMC gate site on the south bank, in the three proposed dredge areas, and at spoils pond sites DS-2 and 3 on Roberts Island (Figures 2-1–2-7).

Areas of willow scrub growing on in-channel islands or on levee banks in the high-tide line may qualify as jurisdictional wetlands under Section 404 of the CWA and are referred to in this chapter as willow scrub wetland. DFG considers riparian communities such as willow scrub to be rare natural communities and maintains a current list of their occurrence in the state in the CNDDDB (California Natural Diversity Database 2004).

4.7.2 Project Impacts

4.7.2.1 SDIP Gate Construction, Channel Dredging, and Gate Operation

Gate Construction and Channel Dredging

DWR and Reclamation will compensate for the temporary loss of up to 0.06 acre of nonjurisdictional riparian habitat for dredge pipe placement in conveyance dredge areas, the permanent loss of less than 0.01 acre of nonjurisdictional willow scrub at the Old River at DMC gate, and the permanent loss of up to 0.20 acre of jurisdictional riparian vegetation at the Middle River, Grant Line Canal, and Old River at DMC gates.

Gate Operation

Approximately 745 acres of valley/foothill riparian community occur in the study area. These communities occupy the area above the existing high-tide elevations. Gate operation would not substantially alter the existing high-tide elevations in the areas upstream or downstream of the gates but would decrease the low-tide elevation upstream of the gates by approximately 1 foot and decrease the low-tide elevations in the downstream area by approximately 2–3 inches. Woody

riparian vegetation generally has root systems that can access groundwater when surface water is unavailable. The change in water availability as a result of decreased low-tide elevations downstream of the gates under project operations would not cause a perceptible change in water availability to riparian vegetation. Because the high tide during project operations would not substantially change from existing conditions and low-tide changes would not be expected to adversely affect riparian vegetation, gate operation is not expected to have an adverse impact on the valley/foothill riparian communities.

4.7.2.2 SDIP Mitigation Measures

The SDIP mitigation measures identified in the SDIP EIS/EIR to avoid, minimize, and compensate for potential impacts on riparian habitat are described below.

Mitigation Measure VFRC1—Avoid and Minimize Disturbance of Riparian Habitat

To the extent possible, DWR and Reclamation will avoid and minimize impacts on riparian habitat. DWR and Reclamation will include the following measures in the project construction conditions to minimize indirect impacts on riparian habitat and on special-status plants that may occur in this community.

- DWR and Reclamation will provide a biologist/environmental monitor who will be responsible for monitoring implementation of the conditions in the state and federal permits (CWA Section 401, 402, and 404; ESA Section 7; Fish and Game Code Section 1601; project plans (SWPPP); and SDIP EIS/EIR mitigation measures).
- The biologist/environmental monitor will determine the location of environmentally sensitive areas adjacent to each gate site and dredge area based on mapping of existing land cover types and special-status plant species (Figures 2-1–2-7). To avoid construction-phase disturbance to sensitive habitats immediately adjacent to the project area, the monitor will identify the boundaries of sensitive habitats and add a 50-foot buffer, where feasible, using orange construction gate fencing. The fencing will be mapped on the project designs. Erosion-control fencing will also be placed at the edges of construction where the construction activities are upslope of wetlands and channels to prevent washing of sediments offsite. The ESA and erosion-control fencing will be installed before any construction activities begin and will be maintained throughout the construction period.
- The biologist/environmental monitor will ensure the avoidance of all sensitive habitat areas, including in-channel islands, during dredging operations.
- DWR and Reclamation will provide a worker environmental training program for all construction personnel prior to the start of construction activities. The program will educate workers about special-status species and riparian habitats present on and adjacent to the site and also about the

regulations and penalties for unmitigated impacts on these sensitive biological resources.

- Landing on in-channel islands, anchoring boats and/or barges to these islands, and encroaching by construction personnel on the islands will be prohibited. The exception to this measure is at Grant Line Canal, where the utility lines will cross the island, and construction personnel will have to access the utility corridor during installation.
- Where feasible, construction will avoid removal of woody vegetation by trimming vegetation to approximately 1 foot above ground level.
- Following construction at the gate sites, the construction contractor will remove all trash and construction debris and implement a revegetation plan for temporarily disturbed vegetation in the construction zones. The elements that should be included in the revegetation of these sites are described in Mitigation Measure VFRC-2.

Mitigation Measure VFRC2—Compensate for Temporary and Permanent Loss of Riparian Habitats

DWR and Reclamation will compensate for the temporary loss of up to 0.06 acre of nonjurisdictional riparian habitat for dredge pipe placement in conveyance dredge areas, the permanent loss of less than 0.01 acre of nonjurisdictional willow scrub at the Old River at DMC gate, and the permanent loss of up to 0.20 acre of jurisdictional riparian vegetation at the Middle River, Grant Line Canal, and Old River at DMC gates.

Compensation will include restoring or enhancing in-kind riparian habitat at a ratio of 3 acres for each acre affected, for a total of 0.81 acre. If temporary impacts are avoided during placement of stationary pipelines, the required mitigation will be less. The mitigation ratio will ensure long-term replacement of habitat functions and values. Revegetation will be planned and implemented prior to the removal of existing riparian vegetation.

As much of the mitigation habitat as possible will be created on-site or near the project area. The Grant Line Canal gate impact will be mitigated by replanting the disturbed vegetation on the in-channel island. Site selection, however, will avoid areas where future dredging, improvements, or maintenance is likely. DWR and Reclamation will obtain site access through a conservation easement or fee title. To the extent practicable, mitigation sites will be located near ongoing and future ERP projects.

DWR and Reclamation will prepare a revegetation plan and monitor the restoration or enhancement mitigation sites. The revegetation plan will be prepared by a qualified restoration ecologist and reviewed by the appropriate agencies. The revegetation plan will specify the planting stock appropriate for each riparian land cover type and each mitigation site, ensuring the use of genetic stock from the south Delta area. The plan will employ the most successful techniques available at the time of planting. Success criteria will be established as part of the plan. Plantings will be maintained for a minimum of 5 years, including weed removal, irrigation, and herbivory protection.

DWR and Reclamation will monitor the plantings annually for 4 years, followed by monitoring in years 8 and 10 following initial mitigation implementation, to ensure the plantings have established successfully. DWR and Reclamation will submit annual monitoring reports of survival to the regulatory agencies issuing permits related to habitat impacts, including the DFG, Corps, and USFWS. Replanting will be necessary if success criteria are not being met. The riparian habitat mitigation will be considered successful when the number of sapling trees established meet the success criteria, the habitat no longer requires active management, and vegetation is arranged in groups that, when mature, replicate the area, natural structure, and species composition of similar riparian habitats in the region.

Specific mitigation funding sources are not identified at this time, but funding will be required and could include contributions from Proposition 13 (Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act, 2000), Proposition 204 (SB 900) (Safe, Clean, Reliable Water Supply Act, 1996), and/or water contractor contributions.

4.7.3 ASIP Conservation Measures

The ASIP conservation measures for riparian habitat are discussed below.

Conservation Measure VFRC-1—Implement Mitigation Measure VFRC1

Implementation of this conservation measure is consistent with the following MSCS programmatic conservation measure for riparian habitat (CALFED Bay-Delta Program 2000a).

- Avoid or minimize disturbance to existing habitat.

Conservation Measure VFRC-2—Implement Mitigation Measure VFRC2

Implementation of this conservation measure is consistent with the following MSCS programmatic conservation measures for riparian habitat (CALFED Bay-Delta Program 2000a).

- Restore or enhance 2–5 acres of additional in-kind habitat for every acre of affected habitat near where impacts are incurred before implementing actions that could result in the loss or degradation of habitat.
- To the extent practicable, include project design features that allow for on-site reestablishment and long-term maintenance of riparian vegetation following project construction.

Implementation of Conservation Measures VFRC-1 and VFRC-2 will fully mitigate impacts of the SDIP on riparian habitat. No additional conservation measures are required.

4.7.4 Expected Outcomes

Implementation of the ASIP Conservation Measures VFRC-1 and VFRC-2 achieves the ASIP goal to avoid, minimize, and compensate for adverse impacts of SDIP actions on riparian habitat. Implementation of these conservation measures will help ensure that the existing functions and values of riparian habitat in the project area are maintained.

4.8 Upland Cropland

4.8.1 Status in the Study Area

Upland cropland habitat is made up of agricultural lands that are not seasonally flooded. Major crops and cover types in agricultural production include small grains (such as wheat and barley), field crops (such as corn, sorghum, and safflower), truck crops (such as tomatoes and sugar beets), forage crops (such as hay and alfalfa), pastures, orchards, and vineyards. The distribution of seasonal crops varies annually, depending on crop-rotation patterns and market forces. Recent agricultural trends in the Delta include an increase in the acreage of orchards and vineyards. General cropping practices result in monotypic stands of vegetation for the growing season and bare ground in the fall and winter. In areas not intensively cultivated, such as fallow fields, roads, ditches, and levee slopes, regular maintenance precludes the establishment of ruderal vegetation or native vegetation communities.

Agricultural irrigation ditches are a part of most of the agricultural fields in the south Delta. Because the habitat provided by agricultural ditches is different from that of agricultural fields, it is described separately. While agriculture is present throughout much of the project area on the land side of the levees, it has only been included in the project area mapping at the proposed flow control and fish control gate sites and within the proposed spoils pond sites on Roberts Island and Stewarts Tract.

Ditches are present throughout much of the upland cropland on the landside of the levees, but because avoidance of these features is assumed for most project activities, they were mapped only within the proposed spoils pond sites on Roberts Island. Ditches are either cement lined or earth lined.

Earth-lined agricultural ditches in the project area are typically installed, removed, and maintained periodically as part of routine farming practices. Most of these ditches are shallow and do not intersect the water table. These ditches

are generally saturated or ponded for long durations; however, the water is pumped on and off as needed as part of routine farming operations (irrigation). Because of the extended length of time that water is present, ditches may exhibit wetland characteristics. They are, however, created features with an artificial water source and are only considered jurisdictional if water is pumped from the ditch to a water of the United States. This circumstance occurs in one ditch on DS-4 where water is pumped from the ditch to Middle River. This ditch supports wetland species, such as sorghum, knotweed, cocklebur, hyssop loosestrife, sprangle-top, and nutsedge.

No special-status plant species are known to occur in upland cropland habitat because of the soil disturbance inherent in the agricultural practices of the south Delta. Agricultural ditches associated with upland cropland have been excavated and are generally subject to maintenance. They have minimal suitable habitat for special-status plants, but have potential to support rose-mallow.

4.8.2 Project Impacts

4.8.2.1 SDIP Gate Construction, Channel Dredging, and Gate Operation

Upland cropland would be permanently lost as a result of gate construction and dredging at gate sites and the three conveyance dredge areas. These two components are discussed below.

Gate Construction and Dredging

Construction at the four gate sites would result in the removal of 2.75 acres of agricultural land. Approximately 1.2 acres of agricultural land at each gate site, for a total of 4.8 acres, would be permanently lost as a result of construction of permanent runoff management basins at each gate site.

Conveyance Dredging

Approximately 165 acres of temporary spoils ponds would be constructed as part of the conveyance dredging action. The potential locations of the spoils ponds have been identified and mapped, although specific sites have not been selected. It is assumed, however, that all spoils pond areas would be constructed on agricultural land adjacent to the dredge operations. DWR is committed to minimizing impacts on sensitive habitats, including wetlands and occurrences of special-status species, and will construct the ponds on agricultural land. These factors will play a major role in the determination of the spoils pond sites. These dredge ponds would remain in use for up to 7 years and would then be returned to agricultural use.

4.8.2.2 SDIP Mitigation Measures

Upland cropland habitat is not a sensitive natural community; therefore, there are no compensation requirements for the permanent or temporary loss of upland cropland habitat. The loss of upland cropland habitat is significant with regard to some ASIP-covered species, including Swainson's hawk; therefore, the SDIP ASIP includes the following mitigation measures to compensate for the potential impacts on upland cropland habitat.

Mitigation Measure UPCR1—Avoid and Minimize Disturbance of Upland Cropland Habitat

To the extent possible, DWR and Reclamation will avoid and minimize impacts on upland cropland habitat.

Mitigation Measure UPCR2—Compensate for Loss of Upland Cropland Habitat

To compensate for the loss of upland cropland habitat DWR and Reclamation will replace forage values of converted agricultural lands before or when project impacts are incurred. The compensation measures for the loss of upland cropland are described in Chapter 6 for the applicable ASIP-covered species.

4.8.3 ASIP Conservation Measures

ASIP conservation measures for upland cropland habitat are discussed below.

Conservation Measure UPCR-1—Implement Mitigation Measure UPCR1

Implementation of this conservation measure is consistent with the following MSCS programmatic conservation measure for upland cropland habitat (CALFED Bay-Delta Program 2000a).

- Avoid or minimize disturbance to existing habitat.

Conservation Measure UPCR-2—Implement Mitigation Measure UPCR2

Implementation of this conservation measure is consistent with the following MSCS programmatic conservation measure for upland cropland habitat (CALFED Bay-Delta Program 2000a).

- Restore or enhance 1–3 acres of suitable habitat near affected lands for every acre of affected habitat regularly used by evaluated species and waterfowl to replace forage values of converted agricultural lands before or when project impacts are incurred.

Implementation of Conservation Measures UPCR-1 and UPCR-2 will fully mitigate impacts of the SDIP on upland cropland habitat. No additional conservation measures are required.

4.8.4 Expected Outcomes

Implementation of the ASIP Conservation Measures UPCR-1 and UPCR-2 achieves the ASIP goal to avoid, minimize, and compensate for adverse impacts of SDIP actions on upland cropland habitat. Implementation of these conservation measures will help ensure that the existing functions and values of upland cropland habitat in the project area are maintained.